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ABSTRACT

In 1988, a national survey was conducted by the Center for the Study of Community Colleges to assess the needs of two-year colleges for faculty, equipment, and facilities for science, social science, mathematics, engineering, and science-based technology programs, and to identify innovative programs for recruiting students into these programs. Telephone interviews were conducted with a faculty member or administrator from a representative sample of 91 community colleges. Study findings included the following: (1) the colleges had an average of 7 full-time and 12 part-time mathematics faculty members, 5 full-time and 4 part-time physical science faculty members, and 9 full-time and 12 part-time social science faculty members; (2) 40% of the colleges had hired new full-time faculty in math, engineering, and technology within the past 2 years; (3) over 50% of the respondents indicated that compared to part-time faculty, full-time faculty were more experienced in teaching, more committed to the institution, in some cases had stronger credentials, and devoted more time to courses and students; and (4) 30% of the respondents felt that their division had better equipment than other divisions on campus, though small and medium-sized campuses rated their own equipment and facilities more highly than did the large campuses. Based on study findings, it was concluded that if enrollment trends continue and state and local budgets remain at their current level or increase, almost 2,000 additional full-time science, mathematics, and engineering/technology faculty will be employed in the next 5 years. (EJV)

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A Pilot Study on Needs in the Sciences in Community Colleges

August 1988

by Debra Banks and Gary Railsback

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INTRODUCTION

In 1987 the Center for the Study of Community Colleges summarized the major findings of prior research on the status of science education in the community colleges . This summary digest included a list of recommendations in the areas of students, faculty, and curriculum to verify these recommendations and extend them, the Center conducted a pilot study focusing on college needs for faculty staffing, equipment and facilities, and program innovations for recruiting students into science programs.

In May and June 1988 the Center conducted telephone interview surveys with staff in public community colleges across the United States. The interviewees were directed to consider science, social sciences, mathematics, engineering and science-based technologies.

This report includes notes on:
The Sample of Colleges
Faculty
Facilities
Equipment
Student Abilities
Resource Allocations
Conclusions/Recommendations
Response Frequencies

All information was obtained from college staff members in interviews conducted by Debra Banks and Gary Railsback, who also drafted the report. The project was conceived and directed by Arthur M. Cohen and Florence B. Brawer.

THE SAMPLE

A random sample of 91 out of 1134 public community colleges was drawn from the *1987 Community, Junior and Technical College Directory* (AACJC, 1987). Participants in the telephone survey consisted of administrators and faculty representatives and were selected by their college presidents upon request by the Center for the Study of Community Colleges. The sample of colleges reflected a normal distribution by enrollment size and a near balanced distribution by region (see tables 1 and 2).

Table 1

National and Sample comparison of Enrollment size[1]

	Enrollment		
	Small 1-1499	Medium 1500-7499	Large 7500 plus
All Colleges	28%	55%	17%
Sample	19%	62%	20%

[1]All college percentages are based on the number of public community colleges.
Source: 1987 Community, Junior and Technical College Directory (AACJC, 1987).

Table 2
Comparison of the National and Sample
Current Faculty Staffing by Region

	Region					
	Northeast	Middle States	South	Midwest	Mountain Plains	West
All Colleges	9	7	32	27	8	18
Sample	11	11	22	28	6	23

[1]All college percentages are based on the number of public community colleges.
Source: 1987 Community, Junior and Technical College Directory (AACJC, 1987).

THE FACULTY

The average number of full and part-time faculty is shown in Table 3. The smaller colleges had higher percentages of full-time faculty in science, math, engineering and technologies. Medium and large size colleges were about equal in full-time faculty ratios except in the areas of engineering and technology (see chart 1).

Table 3

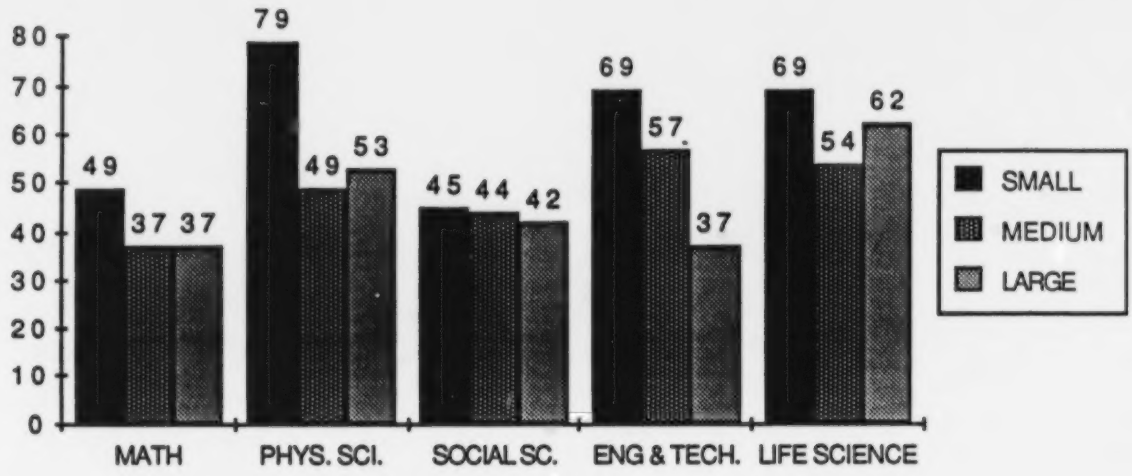
Averages of Full and Part-time Faculty
by Discipline by College Size 1986/87

	Math FT	Math PT	Phys. FT	Phys. PT	SS FT	SS PT	ET FT	ET PT	LS FT	LS PT
Small Size Colleges	3	3	2	1	3	3	4	2	2	1
Medium Size Colleges	5	9	3	3	7	9	8	6	3	3
Large Size Colleges	13	23	10	8	18	25	15	25	10	7
Average for all colleges	7	12	5	4	9	12	9	11	5	4

FT= full-time, PT=part-time, Phys= physical sciences, SS= social sciences, ET= engineering and technology. and LS= life sciences.

CHART 1

PERCENTAGE OF FULL-TIME FACULTY BY COLLEGE SIZE



Changes in Faculty Staffing in the Past Two Years

In answering the question on changes in faculty staffing in the past two years a number of participants gave mixed responses. For example, some stated there were new hires in math disciplines while reducing full-time staff positions in life science at their college. Responses were coded by categories as listed in table 3 and percent frequencies were derived for the categories.

In 40 percent of the cases colleges have hired new full-time faculty in the areas of math, engineering and technology. Full-time replacement hiring has occurred at a 26 percent rate while replacing full-timers with part-timers has only been at a 8 percent level. Reductions in either part-time or full-time faculty pools occurred at a 11 percent rate (see table 4).

Table 4

Percent Changes in Faculty Staffing in the Past Two Years
(1985-86 to 1987-88)

Category	Percent [1]
Replacements for full-time departures	
full-time	26%
part-time	8%
Additional hires	
full-time	40%
part-time	15%
Reduction of teaching staff	11%
Total Responses	95

1. Responses were based on hires or reductions in physical and life science and engineering and technology.

By region new full-time faculty hires have occurred at a greater frequency in the middle Atlantic states (67%) followed by the South (47%) and Midwest (40%) (see table 5).

Table 5

Percent Changes in Faculty Staffing in the Past Two Years by Region [1]

Region	Percent
Northeast	38%
Middle States	67%
South	47%
Midwest	40%
Mountain Plains	17%
West	36%

1. The above percentages reflect full-time hires only.

PROJECTED ADDITIONAL FULL-TIME FACULTY HIRES

The largest number of additional full-time faculty hires are expected to occur in math, engineering and technologies (see table 6). Not shown in table 6 is that the expected hirings in technological areas are almost equally split between the disciplines of electronics, computer science and nursing.

Table 6
Projected Percentage of Additional Full-time Hires
for the next five years by Discipline

	Math	Physical Sciences	Social Sciences	Eng. & Tech	Life Sciences	TOTAL
Percentage	35	14	9	29	13	98%
Total Number	58	24	15	49	21	167

Extrapolating the above number of hires by discipline, approximately 2,082 new full-time positions will be created in science, math, engineering and technology. Positions as broken down by discipline will be 723 math, 299 physical science, 611 engineering and technology, 262 life science and 187 social science.

Hiring patterns by discipline by region (see Table 7) demonstrate that the greatest number of public community college math faculty hires will occur in the West (31%) and South (29%), physical science hires in the Midwest (38%) and West (25%), engineering and technologies in the South (29%) and Northeast (27%), and life science in the Midwest (33%) and West (24%) and South (24%) (see table 7).

Table 7

Projected Percentage of Additional Full-time Faculty Hires for the Next Five Years by Discipline by Region

	Percentages of Hires by Region					
Region	Math	Physical Sciences	Social Sciences	Eng. & Tech	Life Sciences	% of Total Hires by Region[1]
Middle States	7	13	13	16	14	12
Mountain States	2	0	0	4	5	3
Midwest	22	38	47	6	33	21
Northeast	9	8	13	27	0	13
South	29	17	0	29	24	26
West	31	25	27	18	24	25
	100%	101%	100%	100%	100%	100%

[1]Percent by region excludes Social Sciences.

Obstacles for Additional Hires

Although the number of new hires is fairly optimistic, participants felt that certain conditions or events could prevent these hires. The greatest frequency of concerns cited were state budgeting and subsequent monies available for additional salaries (see table 8).

Table 8

Obstacles for New Full-time Faculty Hires: Frequency of Responses (N=107)

Category of Response	Percent
Monies for salaries	30%
State budget	25%
Qualifications and credentialing	15%
Location	7%
Facilities space	4%
Affirmative action	3%
Other [1]	7%
None	10%

[1]Other category included: collective bargaining contracts, enrollments, administration approval, state statutes, and residency requirements.

Qualitative Differences Between Full and Part-time Faculty

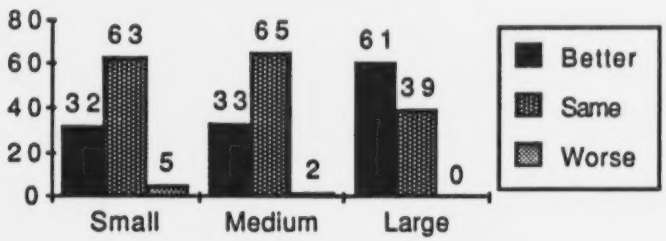
Since 1970 the ratio of part-time faculty nationwide has increased steadily; in 1986 it was 60%. Participants in this study were asked if they found any qualitative differences between full-time and part-time faculty. Over 50 percent of the respondents stated that full-time faculty were: more experienced in teaching, more committed to the institution, in some cases had stronger credentials, and devoted more time to courses and students. On the other hand, part-time faculty had a better perspective of skills students would need for particular job fields and more up to date knowledge in technical areas.

Science and Technology Faculty Preparation

When community college representatives were asked to compare the faculty preparation in the Science and Technology area with other divisions or departments at their campus, 38% responded that their division was better prepared than other divisions. However when the size of the campus was considered, the small and medium size were closer to this average of 38% than was the larger campuses with over 7,500 students where 61% of the respondents rated their faculty better than other divisions.

Chart 2

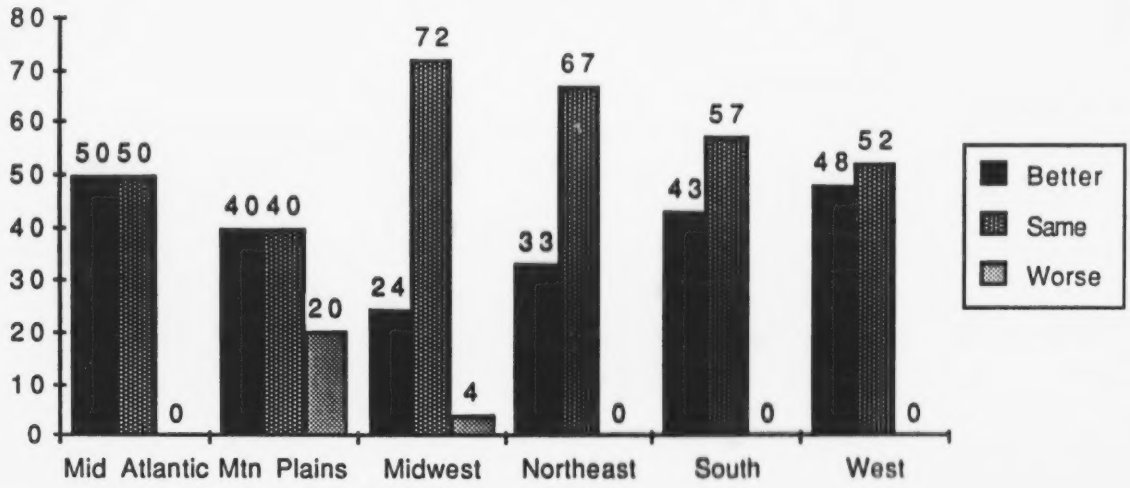
Science & Technology Faculty Preparation
Rating compared with other departments on the same campus



When the region of the country is considered (see chart 3), the percentage responding that their division faculty were better than other divisions was the lowest on those campuses in the Midwest (24%) and Northeast (33%) regions and highest in Campuses in the Mid Atlantic (50%) and Western (48%) regions.

Chart 3

Science & Technology Faculty Preparation Rating compared with other divisions by Region

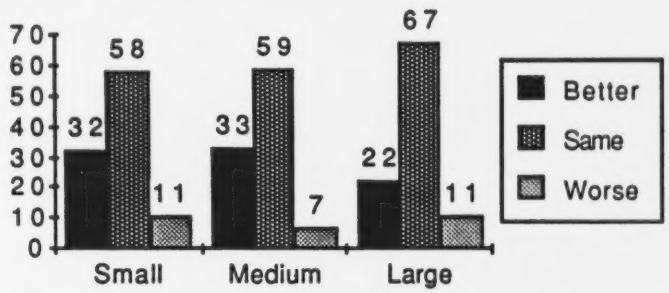


FACILITIES

Though faculty preparation was considered better at larger campuses, this wasn't found to be true for Facilities on those campuses. When asked to compare the facilities for the Science and Technology division with other division facilities on the same campus, the percentage responding that their division was better was highest for the medium size campuses (33%) with smaller facilities next (32%) and the largest campuses the lowest percentage (22%).

Chart 4

Science & Technology Facilities Rating compared with other divisions on the same campus by Campus Size



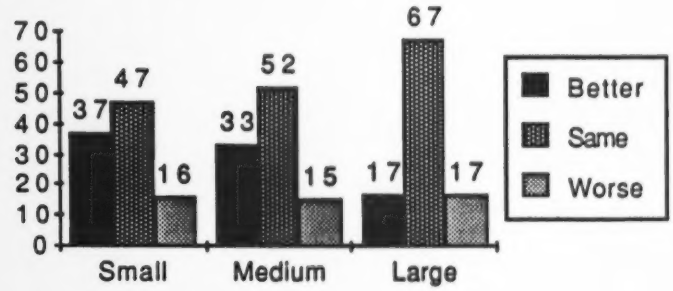
When facilities were rated with other divisions on the same campus and analyzed by region, the Mid Atlantic region again had the highest percentage responding that their division facilities were better than other divisions (60%), followed by the Mountain Plains (40%). For colleges in the Western region, there was a significant difference between the faculty rating and facilities rating. In the faculty comparison the West had 48% agreeing their division was better, but in facilities dropped to last place with only 14% responding their facilities were better.

EQUIPMENT

When asked to compare their equipment with other divisions on the same campus, 30% responded that their division had better facilities. Yet when size of campus is considered, the small campuses had the highest percentage responding that their division had the better equipment (37%) than either the medium size campus (33%) or the large campus (17%). This was similar to what was found in the facilities comparison, that the large campus have a higher rating for faculty but lower in facilities and equipment.

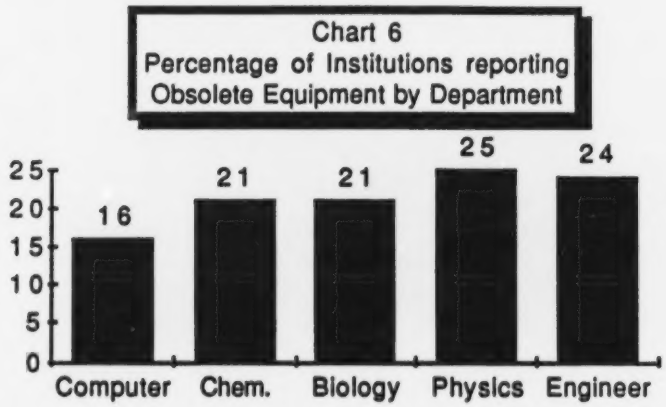
Chart 5

Science & Technology Equipment Rating compared with other divisions at the same college by College Size



The Equipment rating results were similar in that the Mid-Atlantic region had the highest percentage (50%) responding that their equipment was better than other divisions on the same campus and the West had the lowest percentage (10%). Colleges in the Midwest had the highest percentage responding that their equipment was worse than other division (32%) with the Mid-Atlantic and Mountain Plains both having 20% and the West with only 14%.

When the the representatives were asked specifically what equipment they needed to replace, the responses were tallied by the five different departments, with no responses for social sciences. The response with the highest percentage in each of the five areas was that the equipment they already had was obsolete. In Table 6 below are recorded the percentages for each of the divisions.

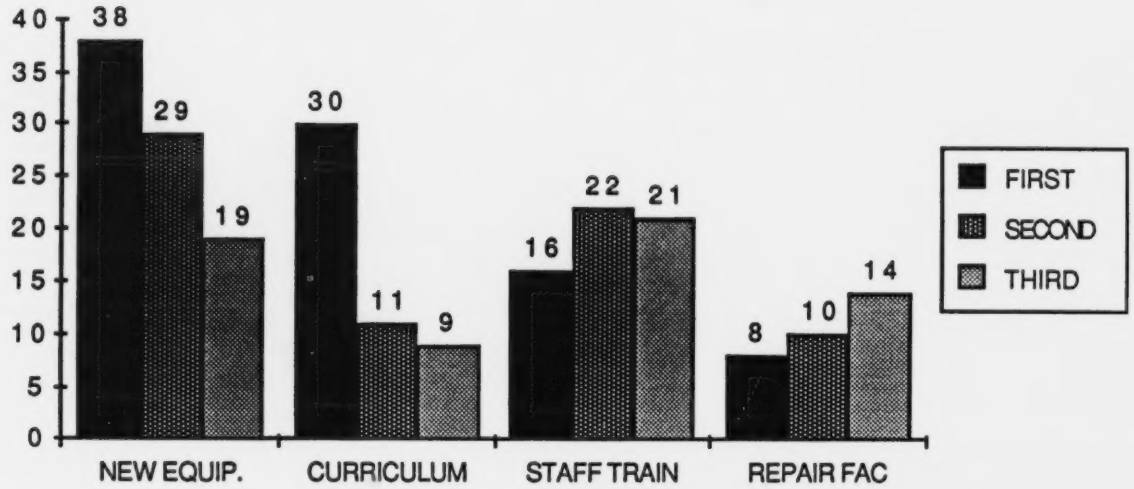


In addition to having a considerable amount of equipment that is obsolete, these representatives when given the opportunity to prioritize funds to upgrade their science and technology program decided that their first and second highest priorities were to purchase new equipment.

Chart 7 gives the percentages of responses for the first, second and third priorities.

Chart 7

FIRST, SECOND AND THIRD PRIORITY FOR UPGRADING SCIENCE AND TECHNOLOGY PROGRAMS

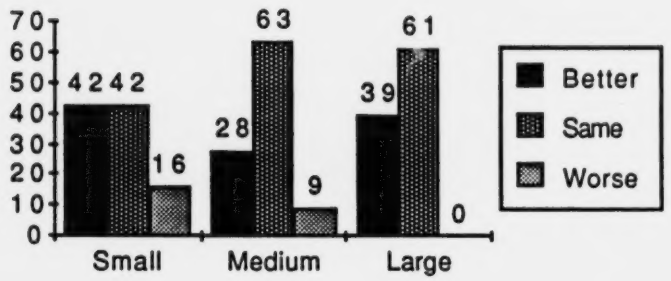


STUDENT ABILITY

The majority of respondents evaluated their student's ability in the Science and Technology divisions as being the same as students in other divisions (58%), with 33% responding that their students were better prepared and only 9% evaluating their students as being below other divisions in preparation. When campus size was considered the small campuses had the highest percentage responding that their students were better (42%), and the medium (63%) and large (61%) campuses had a majority respond that their students had the same abilities as other divisions. While the smaller campuses had the highest percentage responding their students were better prepared they also had the highest percentage (16%) responding that their students were not as prepared as students in other divisions of the same campus.

Chart 8

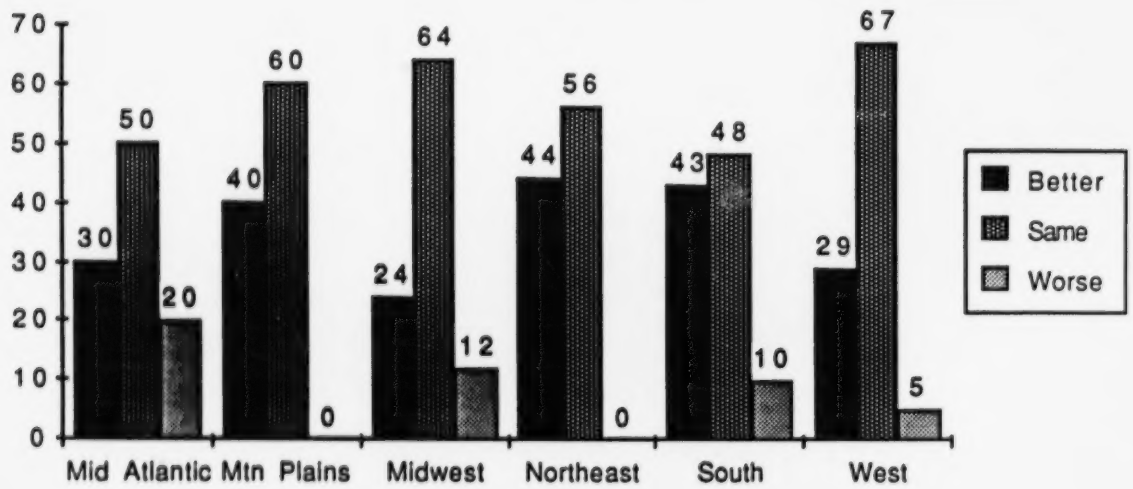
Science & Technology Students Ability compared with students in other divisions of the same campus by Size



While the Mid Atlantic region had been rated strong in the areas of Faculty Preparation, Facilities, Equipment, it slipped to fourth place when student ability was considered by region. While the Western region had been consistently low in all previous areas except faculty, it rose slightly to 29% responding their students were better prepared than other divisions.

Chart 9

Science & Technology Student Ability compared with students in other divisions at the same college by Region

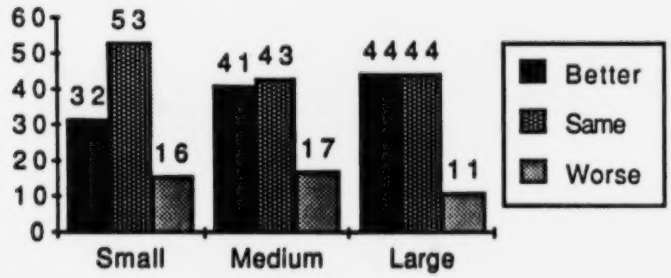


RESOURCE ALLOCATION

The large campus divisions were rated the highest for their faculty preparation being better than other divisions (61%) and their resource allocation (44%) and yet were lower in the areas of facilities, equipment, and student ability. Though their resources are better than other divisions they do not rate what they can actually spend money on as being higher. If these colleges were not limited to a uniform salary range for all faculty it would appear that they are spending their large portion of resources on faculty salaries.

Chart 10

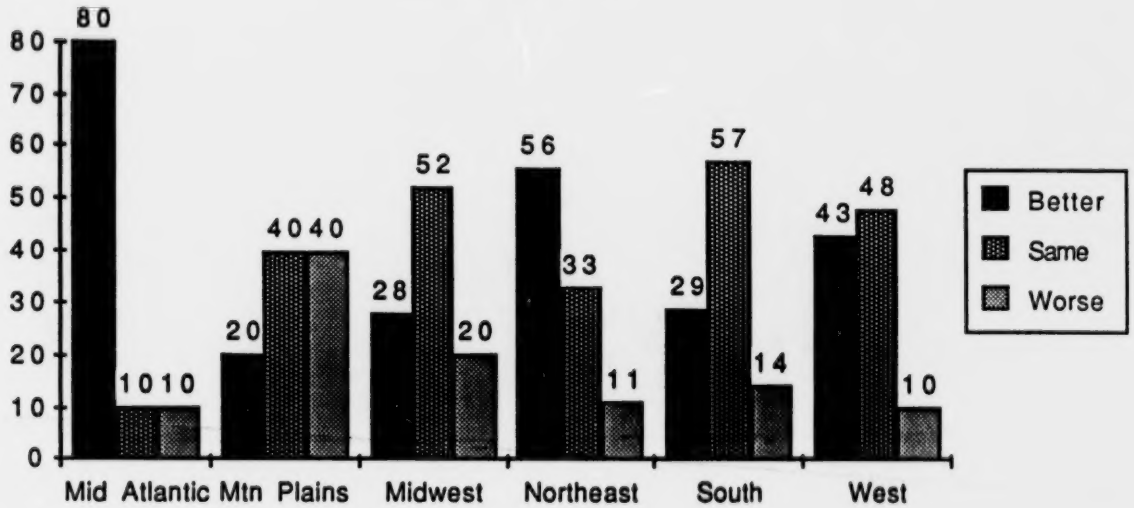
Science & Technology Resource Allocation compared with other divisions on the same campus by Size



The highest response to the question of resource allocation was 40% stating their division was better than other divisions. Yet the Mid Atlantic region responded that 80% were better than other divisions, far ahead of the Northeast region which was 56% and the West with 43%. The other three regions were all in the range of 20% with the South at 28.6%; the Midwest at 28% and the Mountain Plains at only 20%.

Chart 11

Science & Technology Resource Allocation compared with other divisions on the same campus by Region



CONCLUSION:

Science, mathematics, and engineering and technology full-time faculty staffing percentages in the public community colleges are the best in small size colleges with enrollments under 1500. In addition, the small size colleges were second highest in rating their facilities good, highest in rating their equipment good and highest in rating their students better prepared.

Although enrollments in two-year colleges have plateaued since 1982 (U.S. Department of Education, 1988), science, mathematics, and engineering and technology full-time faculty employment has increased particularly in the Mid-Atlantic and southern states. If enrollment trends continue and state and local budgets remain at their current level or increase, almost 2000 additional full-time faculty will be employed science, mathematics, and engineering and technology in the next five years.

RECOMMENDATIONS FOR FURTHER STUDY

Based on the study's findings summarized above, the following recommendations are made to better understand and improve science education in two-year colleges:

Faculty:

1. A comprehensive nationwide study of science, mathematics, and engineering and technology full and part-time faculty is needed to ascertain faculty characteristics by sex, race/ethnicity, degree holding, and the labor markets from which these faculty are being hired.
2. A trend analysis of science, mathematics, and engineering and technology full-time women and minority faculty employment since 1980 is needed and should be coupled with a trend analysis of science, mathematics, and engineering and technology student enrollment by sex and race/ethnicity.
3. Additional analyses should be done on science, mathematics, and engineering and technology full-time faculty regarding: the professional organizations they belong to, professional conferences they attend, their research and publications, and the salaries
4. An analysis of the extent science, mathematics, and engineering and technology full-time faculty act as advisors/ counselors and are involved in student activity and recruitment programs should be made.
5. Finally, science, mathematics, and engineering and technology full-time faculty should be assessed and compared with other community college faculty for job satisfaction and burn-out.

Facilities/Equipment/Resource Allocation:

1. A comprehensive nationwide analysis of science, mathematics, and engineering and technology community college facilities is need. Such analysis should identify utilization of both classroom and laboratory space dedicated to science, mathematics, and engineering and technology programs.
2. A comprehensive nationwide analysis of science, mathematics, and engineering and technology equipment usage and needs should be done. In particular, an assessment is needed on the kinds of teaching equipment constantly used in the classroom and laboratory.

3. Last, a comprehensive nationwide analysis of science, mathematics, and engineering and technology equipment and facilities budgets should be done.

Curriculum:

1. Science, mathematics, and engineering and technologies curricular studies are needed to show similarities and differences in course content and delivery between community college courses and similar courses in high schools and four-year colleges and universities.
2. Comparison studies are needed of associate degree curriculun requirements in science, mathematics, and engineering and technologies.
3. A data base of all innovative science, mathematics, and engineering and technology curricula should be constructed.
4. An assessment study should be made of science, mathematics, and engineering and technology course completion requirements.
5. An assessment study of science, mathematics, and engineering and technology curricular trends (eg. implementation of critical thinking and writing across the curriculum) relative to student outcomes should be made.

Students:

1. Study of the community college contribution to student flow toward science-based professions should be made so that the colleges' efforts and outcomes may be placed in the overall higher education context.

QUESTIONNAIRE:

Spring 1988 Phone Interview

QUESTIONS FOR DEPARTMENT/DIVISION CHAIR OR DEAN OF TECHNOLOGY

1. How many faculty teach (responses are the average number for all colleges)

	Full Time	Part Time
Math	7	12
Physical Sciences	5	4
Social Sciences	9	12
Engineering/Technology	9	11
Life Sciences	5	4

(See also Table 3 and Chart 1)

2. What changes in staffing have you made in the past two years?

Replace full-time departures with full-time	26%
Replace full-time departures with part-time	8%
Additional full-time hires	40%
Additional part-time hires	15%
Reducing of teaching staff	11%

(See also Tables 4 and 5)

3. Do you anticipate needing additional staff in the next five years?

Yes	78%
No	22%

If Yes, please indicate number and fields.

Faculty:

Teaching field:	No. Full-time
Math	58
Physical Sciences	24
Social Sciences	15
Engineering & Technology	49
Life Sciences	21

(See also Tables 6 and 7)

4. If you foresee any obstacles in employing these people, please indicate what they might be.

Monies for Salaries	30%
State Budget	25%
Qualifications and credentialing	15%
Location	7%

Facilities and space	4%
Affirmative action	3%
Other	7%
None	10%

(See Table 9)

5. Are there qualitative differences between full-time and part-time faculty?

Full-time are more experienced in teaching	41%
Full-time are more committed to the institution	23%
Full-time have stronger credentials	13%
Full-time devote more time to courses and students	10%
Part-time have a better perspective of the skills students would need for particular job fields	3%
Part-time have more up to date knowledge in technical areas	10%

6. How would you rate the facilities and equipment in your division?

Poor	Fair	Good	Excellent
5%	25%	49%	21%

7. How would you compare the science and technology programs with other programs at your college?

	Better	Worse	Same
Faculty preparation	38%	2%	59%
Facilities	30%	9%	60%
Equipment	30%	15%	53%
Student ability/preparation	33%	9%	58%
Resource Allocation	39%	15%	45%

8. Using these categories, how would you compare your science and technology programs with those in:

	Better	Worse	Same	No Response
Local high schools	91%	0%	7%	2%
Other community colleges in your area	47%	11%	39%	3%
Four-year colleges and universities	25%	28%	41%	5%

9. If you were given funds to use for upgrading your science and technology program, toward which of the following could the funds best be applied?

What would be your first priority? (N=63)	
New Equipment	38%
Curriculum Development	30%
Staff Training	26%
Repair/Rebuild Facilities	8%
Additional Labs	5%
Research on Teaching/Learning	2%
Conference Travel	2%

What would be your second priority? (N=63)	
New Equipment	29%
Staff training	22%
Additional Labs	13%
Curriculum Development	11%
Repair/Rebuild Facilities	10%
Research on Student Outcomes	10%
Research on Teaching/Learning	5%
Conference Travel	2%

What would be your third priority? (N=57)	
Staff training	21%
New equipment	19%
Repair/Rebuild facilities	14%
Additional Labs	11%
Conference travel	11%
Curriculum Development	9%

Research on Student Outcomes	7%
Counselor Information	5%
Research on Teaching/Learning	4%

The frequency for all 92 cases regardless of priority for each category are as follows:

New equipment	82%
Staff training	53%
Curriculum development	50%
Additional laboratory stations	36%
Repair or rebuild facilities	28%
Research on student outcomes	22%
Conference travel	14%
Research on teaching,learning	13%
Other	9%
Counselor information	7%

10. What specific deficiencies in facilities or equipment do you have now or foresee as imminent?

Classrooms	28%
Laboratories	37%
Storage space	22%
Rent facilities in area	3%
New buildings or now constructing	10%
Need faculty offices/furniture	17%
Renovate old buildings	10%

Computer Equipment needed:	
None listed	46%
software	1%
Both software & hardware	15%
Computer lab	17%
Computer Integrated Manufacturing	1%
Just replaced equipment	2%
Equipment is Obsolete	16%
Repair current equipment	1%
Chemistry Equipment needed:	
None listed	50%
Balances	1%
All equipment needed	2%
Computer lab	13%
Just replaced equipment	2%
Lab	9%
Obsolete equipment	21%
Repair current equipment	2%
Biology Equipment needed:	
None listed	44%
Microbalances/sterilizers	4%
Microscopes	3%
Computer lab	10%
Microbalances,Microscopes/Computer lab	2%
Just replaced equipment	2%
Laboratory	12%
Obsolete equipment	21%
Repair current equipment	2%
Physics Equipment needed:	
None listed	44%
Laser/Fiber optic	1%
All equipment needed	5%
Computer lab	10%
Just replaced equipment	2%
Laboratory	11%
Obsolete equipment	25%
Repair current equipment	2%
Engineering Equipment needed:	
None listed	48%
CAD/CAM	7%
Graphic Reproduction	1%
AV/Robotics	1%
Computer Lab	12%
Firearms	1%
Just replaced equipment	3%
Lab	1%

Obsolete equipment	24%
Repair current equipment	2%

11. How could more students be encouraged to enroll in science, mathematics and engineering technology programs?

Articulation programs with High Schools	52%
Junior High Articulation programs	25%
Advertisement/Publicity	17%
Elementary School Programs	15%
Provide more vocational counseling	14%
On Campus events for High School students	11%
Internships/Work Experience	11%
Marketing Study	10%
Transfer programs with four year colleges	8%
Scholarships	8%
Career Fairs with Industry	7%
Develop "Tech Prep" curriculum with high schools	5%
Bring High School Faculty on Campus	4%
Offer Developmental courses	4%

12. Have you done anything special to encourage participation by women and minority students?
For example, initial enrollments or retention and program completion?

<u>Re: Women's Recruitment/Retention</u>	
College has "Women's Program"	49%
College hasn't developed special Women's program	37%
Majority of Students are already women	5%
Majority of students are women & have programs	2%
Attempting to hire women faculty	2%
Advertising	1%
Have Women's program and advertising	1%
Provide childcare for women students	1%
<u>Re: Minority Recruitment/Retention</u>	
Have minority recruitment program	42%
Don't have minority program	42%
Few minorities in service area	7%
Seeking to hire minority faculty as role model	2%
Already have proper ratio of minority to area population	2%
Faculty involvement in this area	1%

REFERENCES

American Association of Community and Junior College. *Community, Junior, and Technical College Directory, 1987.* Washington, D.C.: American Association of Community and Junior Colleges. 1987.

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Cohen, A.M. and Brawer, F.B. Knowns and Unknowns About Science Education At the Community Colleges. Los Angeles, CA: Center for the Study of Community Colleges. Unpublished document. June 1987.

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DEFINITIONS

Life Sciences: Includes Biology and Nutrition

Physical Sciences: Includes Physics, Chemistry, Earth Science, Geology, and Astronomy.

Social Sciences: Includes Psychology, Sociology, Anthropology, History, and Political Science.

Technologies: Focused on scientific theory based courses: Electronics, CAD/CAM, Aviation, Nursing, and health related fields.

PARTICIPATING COLLEGES BY STATE BY REGIONS

NORTHEAST

Connecticut
- Quinebaug Valley
- Waterbury State Tech College

Massachusetts
- Cape Cod
- Springfield Technical

New Hampshire
- New Hampshire Tech. Inst.

New York
- Broome
- Genesee
- Onondaga
- Orange County

Vermont
- Vermont Tech. Coll.

MIDDLE STATES

Maryland
College-
- Anne Arundle
- Chesapeake
- Frederick
- Montgomery

New Jersey
- Atlantic
- County College of Morris
- Raritan

Pennsylvania
- Butler County
- Thaddeus Stevens State School
- Westmoreland County

MIDWEST

Illinois
- Chicago City-Wide
- Wilbur Wright
- Highland
- John Wood
- William Rainey Harper

Iowa
- North Iowa Area
- Southeastern-North & South

Michigan
- Kirtland
- Monroe County
- Muskegon
- Oakland-Highland Lakes
- Schoolcraft

Minnesota
- Minneapolis
- Willmar
- University of Minnesota Technical
  - Crookston

Missouri
- East Central
- Penn Valley
- Three Rivers
- Trenton

Nebraska
- Metropolitan Technical
- Mid Plains
- Southeast-Beatrice

(Midwest continued on next page)

SOUTH

Arkansas
- Phillips County
- S. Arkansas U.-El Dorado

Florida
- Central Florida

Sheboyan
- Palm Beach
- Polk
- South Florida

Kentucky
- Owensboro
- Somerset

North Carolina
- Anson Tech. Coll.
- Forsyth Tech. Coll.
- Randolph Tech.
- Wilks

South Carolina
- Midlands Tech.

Texas
- Alvin
- Austin
- Cisco
- El Centro
- Franks Phillips
- Odessa

Virginia
- Rappahannock

MIDWEST (Continued)

Ohio
- Youngstown State

Wisconsin
- University of Wisconsin Center-

- Gateway Technical-Racine

MOUNTAIN PLAINS

Kansas
- Independence

Montana
- Flathead Valley

New Mexico
- Eastern New Mexico University-Clovis
- New Mexico Jr. College

Oklahoma
- Rogers State College

WEST

Arizona
- Arizona Western

California
- Cabrillo
- College of the Redwoods
- Long Beach City College
- Fullerton
- College of Alameda
- Riverside
- San Diego Miramar
- City College of San Francisco
- Santa Clarita Community
- Santa Rosa
- Mission-Santa Clara
- Yuba

Nevada
- Clark County

Oregon
- Blue Mountain
- Clatsop
- Portland
- Southwestern Oregon

Washington
- Pierce
- North Seattle
- Whatcom

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